

### Precision Thick Film Chip Resistors

**ERJ R: 0402, 0603, 0805**

**ERJ E: 0603, 0805, 1206, 1210, 1812**

Type: **ERJ 2R, 3R, 6R**

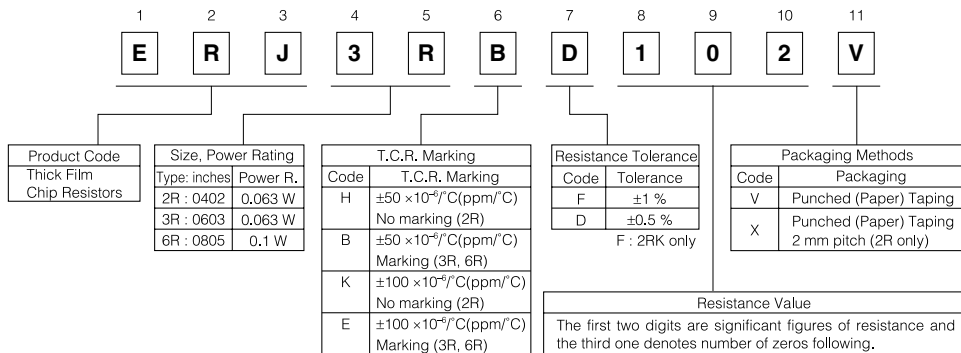
**ERJ 3E, 6E, 8E, 14, 12**



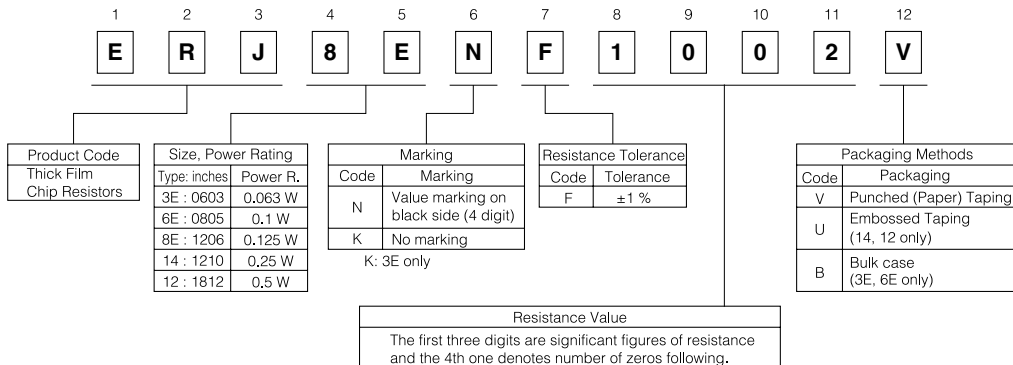
#### ■ Features

- Small size and lightweight  
For PCB size reduction and lightweight products
- High reliability  
Metal glaze thick film resistive element and three layered electrode results in high reliability.
- Matching with placement machines  
Bulk, Taping and magazine packagings for automatic placement machines
- Solderability  
Suitable for both reflow soldering and flow soldering
- Marking  
Four digit marking of resistance value on resistive element side (except 2R, 3R, 6R, 3E Type)
- High power  
One rank up approval of power rating is available for 3E, 6E, 8E type
- Low Resistance Tolerance  
ERJ3E, 6E, 8E, 14, 12 Series ... ±1%  
ERJ2R, 3R, 6R Series ..... ±0.5%, ±1%
- Approved under the ISO 9001 system  
Approved under the QS-9000 system
- Reference Standards  
IEC 60115-8, JIS C 5201-8

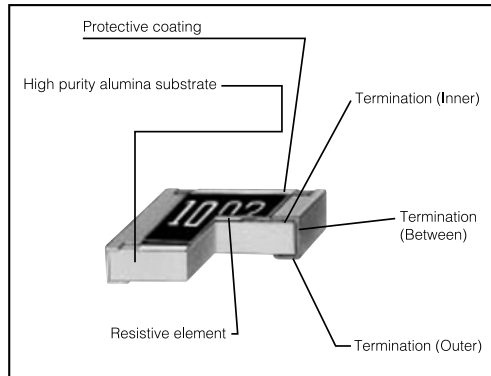
#### ■ Explanation of Part Numbers (ERJ2R, 3R, 6R Series)



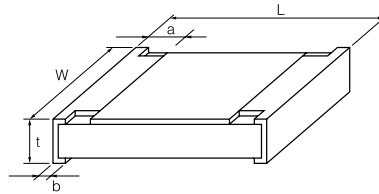
#### ■ Explanation of Part Numbers (ERJ3E, 6E, 8E, 14, 12 Series)



### Construction



### Dimensions in mm (not to scale)



Type (inches)	Dimensions (mm)					Weight (1000 pcs.)
	L	W	a	b	t	
ERJ2R (0402)	1.00 <sup>+0.05</sup>	0.50 <sup>+0.05</sup>	0.20 <sup>+0.10</sup>	0.25 <sup>+0.05</sup>	0.35 <sup>+0.05</sup>	0.8 g
ERJ3R (0603)	1.60 <sup>+0.15</sup>	0.80 <sup>+0.15</sup> <sub>-0.05</sub>	0.30 <sup>+0.20</sup>	0.30 <sup>+0.15</sup>	0.45 <sup>+0.10</sup>	2 g
ERJ6R (0805)	2.00 <sup>+0.20</sup>	1.25 <sup>+0.10</sup>	0.40 <sup>+0.20</sup>	0.40 <sup>+0.20</sup>	0.60 <sup>+0.10</sup>	4 g
ERJ3EK (0603)	1.60 <sup>+0.15</sup>	0.80 <sup>+0.15</sup> <sub>-0.05</sub>	0.30 <sup>+0.20</sup>	0.30 <sup>+0.15</sup>	0.45 <sup>+0.10</sup>	2 g
ERJ6EN (0805)	2.00 <sup>+0.20</sup>	1.25 <sup>+0.10</sup>	0.40 <sup>+0.20</sup>	0.40 <sup>+0.20</sup>	0.60 <sup>+0.10</sup>	4 g
ERJ8EN (1206)	3.20 <sup>+0.05</sup> <sub>-0.20</sub>	1.60 <sup>+0.05</sup> <sub>-0.15</sub>	0.50 <sup>+0.20</sup>	0.50 <sup>+0.20</sup>	0.60 <sup>+0.10</sup>	10 g
ERJ14N (1210)	3.20 <sup>+0.20</sup>	2.50 <sup>+0.20</sup>	0.50 <sup>+0.20</sup>	0.50 <sup>+0.20</sup>	0.60 <sup>+0.10</sup>	16 g
ERJ12N (1812)	4.50 <sup>+0.20</sup>	3.20 <sup>+0.20</sup>	0.50 <sup>+0.20</sup>	0.50 <sup>+0.20</sup>	0.60 <sup>+0.10</sup>	27 g

### Ratings

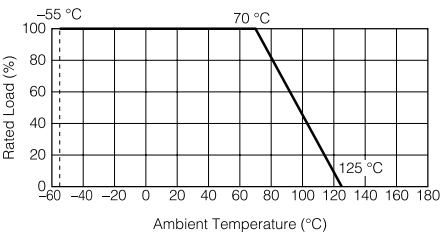
Type (inches)	Power Rating at 70 °C (W)	Limiting Element Voltage (Maximum RCWV) <sup>(1)</sup> (V)	Maximum Overload Voltage <sup>(2)</sup> (V)	Resistance Tolerance (%)	Resistance Ranges (Ω)		T.C.R. ×10 <sup>-6</sup> /°C (ppm/°C)	Standard Resistance Values
					min.	max.		
ERJ2R (0402)	0.063	50	100	±1, ±0.5	10	91	±100	E24
					100	100 K	±50	
					110 K	1 M	±100	
ERJ3R (0603)	0.063	50	100	±0.5	10	91	±100	E24
					100	100 K	±50	
					110 K	1 M	±100	
ERJ6R (0805)	0.1	150	200	±0.5	10	91	±100	E24
					100	100 K	±50	
					110 K	1 M	±100	
ERJ3EK (0603)	0.063 (0.1) <sup>(2)</sup>	50	100	±1	10	1 M	±100	E24, E96
ERJ6EN (0805)	0.1 (0.125) <sup>(2)</sup>	150	200	±1	10	2.2 M	±100	E24, E96
ERJ8EN (1206)	0.125 (0.25) <sup>(2)</sup>	200	400	±1	10	2.2 M	±100	E24, E96
ERJ14N (1210)	0.25	200	400	±1	10	1 M	±100	E24, E96
ERJ12N (1812)	0.5	200	400	±1	10	1 M	±100	E24, E96

(1) Rated Continuous Working Voltage (RCWV) should be determined from  $RCWV = \sqrt{\text{Power Rating} \times \text{Resistance Values}}$ , or Limiting Element Voltage (max. RCWV) listed above, whichever less.

(2) Overload (Short-time Overload) Test Voltage (SOTV) should be determined from  $SOTV = 2.5 \times \text{Power Rating}$  or max. Overload Voltage listed above whichever less.

Power Derating Curve

For resistors operated in ambient temperatures above 70 °C, power rating should be derated in accordance with the figure on the right.

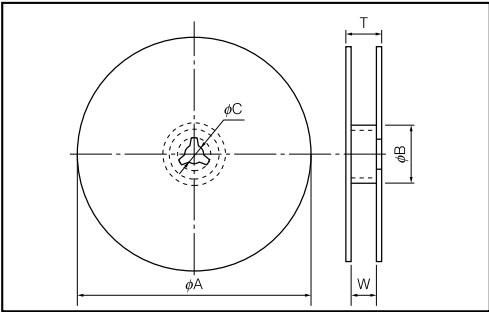


■ Packaging Methods

● Standard Quantity

Type (inches)	Thickness (mm)	Punched (Paper) Taping (4 mm pitch)	Embossed Taping (4 mm pitch)	Bulk Case
ERJ2R (0402)	0.35	10000 pcs./reel(2 mm pitch)		
ERJ3R (0603)	0.45	5000 pcs./reel		
ERJ6R (0805)	0.6	5000 pcs./reel		
ERJ3EK (0603)	0.45	5000 pcs./reel		25000 pcs./case
ERJ6EN (0805)	0.6	5000 pcs./reel		10000 pcs./case
ERJ8EN (1206)	0.6	5000 pcs./reel		
ERJ14N (1210)	0.6		5000 pcs./reel	
ERJ12N (1812)	0.6		5000 pcs./reel	

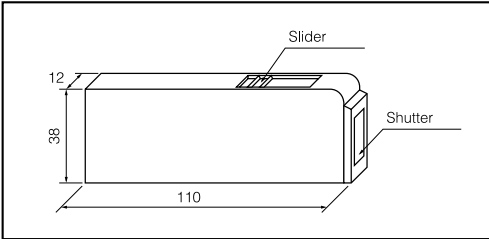
● Taping Reel



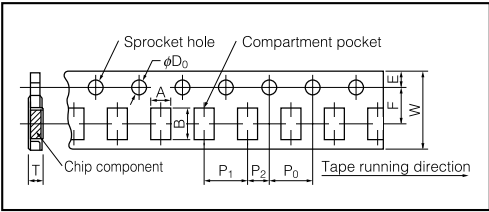
(mm)	Type	$\phi A$	$\phi B$	$\phi C$	W	T
Dimensions	2R,3R,6R 3EK,6EN, 8EN,14N	180.0 <sup>0</sup> <sub>-3.0</sub>	60 min.	13.0 <sup>+1.0</sup>	9.0 <sup>+1.0</sup>	11.4 <sup>+2.0</sup>
	12N				13.0 <sup>+1.0</sup>	15.4 <sup>+2.0</sup>

● Bulk Case

(mm)

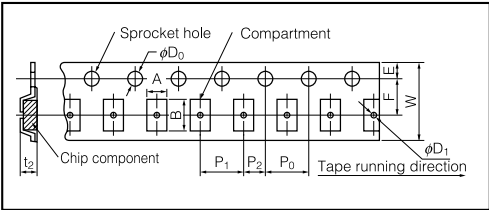


● Punched (Paper) Taping



(mm) Dimensions	Type	A	B	W	F	E	P <sub>1</sub>	P <sub>2</sub>	P <sub>0</sub>	ϕD <sub>0</sub>	T
	2R	0.70 <sup>+0.05</sup>	1.20 <sup>+0.05</sup>	8.00 <sup>+0.20</sup>	3.50 <sup>+0.05</sup>	1.75 <sup>+0.10</sup>	2.00 <sup>+0.10</sup>	2.00 <sup>+0.05</sup>	4.00 <sup>+0.10</sup>	1.50 <sup>+0.10</sup>	0.45 <sup>+0.05</sup>
	3R,3EK	1.10 <sup>+0.10</sup>	1.90 <sup>+0.10</sup>				4.00 <sup>+0.10</sup>				0.64 <sup>+0.05</sup>
	6R,6EN	1.65 <sup>+0.15</sup>	2.50 <sup>+0.20</sup>								0.84 <sup>+0.05</sup>
8EN	2.00 <sup>+0.15</sup>	3.60 <sup>+0.20</sup>									

● Embossed Taping



(mm) Dimensions	Type	A	B	W	F	E	P <sub>1</sub>
	14N	2.80 <sup>+0.20</sup>	3.50 <sup>+0.20</sup>	8.00 <sup>+0.30</sup>	3.50 <sup>+0.05</sup>	1.75 <sup>+0.10</sup>	4.00 <sup>+0.10</sup>
	12N	3.50 <sup>+0.20</sup>	4.80 <sup>+0.20</sup>	12.00 <sup>+0.30</sup>	5.50 <sup>+0.05</sup>		

(mm) Dimensions	Type	P <sub>2</sub>	P <sub>0</sub>	ϕD <sub>0</sub>	t <sub>2</sub>	ϕD <sub>1</sub>
	14N	2.00 <sup>+0.05</sup>	4.00 <sup>+0.10</sup>	1.50 <sup>+0.10</sup> <sub>0</sub>	1.00 <sup>+0.10</sup>	1 min.
	12N					1.5 min.

⚠ Safety Precautions

1. If transient load (heavy load in a short time) like pulse is expected to be applied, carry out evaluation and confirmation test with the resistors actually mounted on your own board.  
When the load of more than rated power is applied under the load condition at steady state, it may impair performance and/or reliability of resistor.  
Never exceed the rated power.
2. Chlorine type or other high-activity flux is not recommended as the residue may affect performance or reliability of resistors.
3. When soldering with soldering iron, never touch the body of the chip resistor with a tip of the soldering iron. When using a soldering iron with a tip at high temperature, solder for as short a time as possible (three seconds or less up to 350 °C).
4. Avoid physical shock to the resistor and nipping of the resistor with hard tool (a pair of pliers or tweezers) as it may damage protective film or the body of resistor and may affect resistor's performance.